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marks an epoch in the meteorological history of the Antarctic regions.

The meteorological conditions of the antarctic and sub-antarctic regions are shown on 883 daily charts, which include 44,893 observations. Cooperation was obtained from 233 ships and 92 land stations, including several observatories. Through the courtesy of the leaders of the German (Professor von Drygalski), Scottish (Dr. W. S. Bruce) and Swedish (Dr. Otto Nordenskiöld) Antarctic Expeditions observations were used from Kaiser Wilhelm II. Land, Laurie Island, South Orkneys and Snow Hill Island and Palmer Land.

One hundred and twenty supplementary charts exhibit for each month of the year (and for the year) the mean sea-level pressure and air temperature, with the mean temperature and the mean pressure for each month from October, 1901, to March, 1904.

The wind observations are also summarized in ten tables as to direction and force, arranged according to seasons, to related zones and to oceanic divisions.

Commander Hepworth is justified in setting forth the magnitude of the work, though his statement is questioned that the charts "refer to an area that is far larger than that embraced by any similar set of charts hitherto published." While true as to the Antarctic regions, he seems to have forgotten the daily charts of international meteorological observations, published by the signal corps of the United States army from July, 1878, to June, 1884, which covered the entire northern hemisphere and embodied observations from more than 1,000 regular observers.

The results as set forth by Commander Hepworth are of interest and value. "The average path of all central areas of depressions is found to have been in about the 52d parallel. Between the meridians of 20° E. and 150° E., it was between the 49th and 50th parallels; and between 150° E. and 70° W. in about the 55th." The average rate of travel is about 300 miles per day. One storm, with an average rate of 355 miles daily, was charted through a course of 2,840 miles. It may be

added that the assumption of the late Mr. H. C. Russell is confirmed, that to the east of the 30th meridian E., centers of atmospheric depressions usually travel on paths south of the 43d parallel during winter, and south of the 46th parallel in summer.

Of special interest are the conclusions as to the general movements of the atmosphere. Commander Hepworth says: "The interchange of air between equatorial and polar regions may be effected through the intermediary of anticyclonic circulations, albeit these high-pressure systems are permanent; and in my opinion the temperature zones are bridged in this manner."

The charts of mean pressures clearly indicate a seasonal migration of high pressure belts in the Antarctic regions. This action is evidently general. Pointed out by Buchan in a general way, these atmospheric phenomena for the northern hemisphere were definitely set forth by the reviewer in a series of charts, published in Appendix 17, Annual Report of the Chief Signal Officer of the Army, 1891.

An incidental feature of this magnificent work requires notice. The Antarctic map of Volume I., 1908, omitted entirely Wilkes's Antarctic discoveries. The key map of Volume II. contains the legend: "Land reported by Commander Wilkes, U. S. N., 1840." Twelve months prior to the transmittal of the proofs of the introductory remarks, an Australian, Dr. Mawson, had not only visited this "reported" land but had established two scientific stations thereon, and to-day with courage and energy creditable to the British empire adds to the world's knowledge of this vast and ice-crowned continent, so long discredited.

A. W. GREELY

#### THE BELGIAN ANTARCTIC EXPEDITION

*Resultats du voyage du S. Y. Belgica en 1897-8-9, sous le commandement de A. DE GERLACHE DE GOMERY. Rapports Scientifiques. GÉOLOGIE. Petrographische untersuchungen des gesteinsproben, II., von DRAGOMIR SISTEK. 1912, pp. 20, 1 pl. ZOOLOGIE. Tuniciers caducichordata (Asci-*

diacés et Thaliacés) par E. VAN BENEDEN et MARC DE SELYS-LONGCHAMPS. 1913. Pp. 120. 17 pl.

The rocks reported on from the Antarctic are chiefly from Cape Gregory and Elisabeth Island. From the former locality granite and diorite, quartz porphyry, porphyrite, andesite and diabase, with a single specimen of basalt. Metamorphic schist and a quartz-feldspar conglomerate were also represented in the collection.

From Elisabeth Island, diorite, andesite, diabase and mica schist are reported.

The other rocks reported on are mostly from Punta Arenas and other points about the Magellan Straits and are of less interest.

A fine plate gives microphotographs of sections of the more interesting crystalline rocks.

The study of the Tunicates had been nearly completed by Professor Van Beneden when his researches were interrupted by death. But his text was entirely completed only for the Salpas and the plates referring to them. For the rest, notes, sketches, plates, etc., much remained to be coordinated and the text to be prepared by the later editor. With the exception of Plate VIII., all the plates are from figures left by Van Beneden. The classification adopted is that of Hartmeyer.

The Antarctic species collected by the expedition comprise two new species of *Corella* and a single *Boltenia*, which have been exhaustively monographed. The other species, also new, are from the Ohilian coast. The Salpas are Antarctic and are the first brought from this distant region. They include one new species and a new variety of *S. fusiformis*.

The plates are of remarkable beauty and the work will add materially to the existing knowledge of the subject.

W. H. DALL

*Abwehrfermente des tierischen Organismus gegen körperl., blutplasma- und zellfremde Stoffe, ihr Nachweis und ihre diagnostische Bedeutung zur Prüfung der Funktion der einzelnen Organe.* Von EMIL ABDERHALDEN. Second edition. Published by Julius

Springer, Berlin. 1913. Pp. ix + 199; with eleven text figures and one plate. Bound M. 6.40; paper covers M. 5.60.

In the second edition<sup>1</sup> of this booklet, the first appeared about one year ago, Abderhalden gives a clearer and more fully developed presentation of a defensive mechanism of the body which his researches have already shown to be of great interest and importance. Briefly stated, Abderhalden believes, on the basis of experimental work, that all soluble members of the proteid, fat and carbohydrate groups produce ferments when they come into contact with an organism's cells which are unaccustomed to their presence. The foreign proteid, for example, may be the characteristic proteid of another species, as when horse serum is injected into a dog, or it may be a proteid which is a characteristic component of the organism itself, but which through some process or other is found in localities where it does not normally belong, as when placental tissue components circulate in the maternal organism. In either case ferments are formed which digest the body-alien or blood-alien proteid. These ferments moreover are not specific when a proteid is injected in the crude laboratory experiment, but they are specific when the body inoculates itself, as for example during pregnancy. This specificity of the resultant ferment has made it possible for Abderhalden and his collaborators to make the differential diagnosis in hundreds of cases between pregnancy and non-pregnancy, practically without error, although many of them were complicated with cancer, salpingitis, tuberculosis, etc. This part of the work has been in general corroborated by other and independent workers. Abderhalden, however, carried the experimental development of this view still further. He argues that as all diseases must necessarily disturb the functional activity of some organ or organs, it is probable that these structures will form abnormal products. These abnormal products when thrown into the blood and lymph stream will act as blood-alien or cell-alien substances and will stimulate

<sup>1</sup> The first edition was reviewed in SCIENCE, 1913, Vol. XXXVII., p. 837.

the production of ferments specifically built to digest these foreign bodies. The test for these ferments is made by permitting the serum of the diseased individual to act upon the tissue of the organ at fault and searching for digestive products. The systematic test of organ after organ against the specific ferments formed would thus show which structure or structures was diseased, for only the pathologically altered organ or organs would undergo digestion.

It also would seem possible to study the interrelation of organs: when one organ is extirpated its absence affects some other structure or structures and causes the formation of abnormal metabolic products which in turn will betray their presence by the occurrence of specific ferments against themselves in the serum. Indeed, Abderhalden considers these defensive ferments, which are possibly formed by the leucocytes, as reagents for the detection of the characteristic structure of cellular constituents, and he justly points out that this conception opens up an enormous field for fruitful investigation.

The experimental technique for the detection of these ferments is full of difficulties. As the ferments themselves can not be isolated, their presence is proven, in the dialysis method, by demonstrating the occurrence of diffusible cleavage products after the serum has acted upon the prepared proteid. This demands a rigid asepsis to prevent bacterial contaminations. In addition there are numerous details upon whose observance Abderhalden emphatically insists. A full discussion of all these points, in fact a complete laboratory guide for the practical worker in this special field, forms an important part of the second edition of the booklet; this section will aid greatly in bringing about a full and rigid test.

From the short statement given above it will be seen that Abderhalden's brilliant development of this view concerning a defensive mechanism of the body has a breadth and promise which fully warrants the interest the scientific medical world has shown.

JOHN AUER

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*Bovine Tuberculosis and Its Control.* By VERANUS ALVA MOORE, B.S., M.D., V.M.D., Professor of Comparative Pathology, Bacteriology and Meat Inspection, New York State Veterinary College at Cornell University, and Director of the College. Ithaca, N. Y., Carpenter & Company. 1913.

The title of this book and the name of the author would naturally lead one to expect a complete treatise on this important subject. The book, however, is a distinct disappointment.

It contains 104 pages of matter by Dr. Moore. There is an appendix of 34 pages, which gives the Report of the International Commission on the Control of Bovine Tuberculosis, and following this are 30 plates, which for the most part are excellent.

The scope of the book can be understood by noting the space devoted to the different subjects. "The History of Tuberculosis in Cattle," occupies three and three fourths pages; "Distribution, Economic and Sanitary Importance of Bovine Tuberculosis" takes up nine pages. The "Sanitary Importance," which is included in this chapter, takes up one and three fourths pages. "The Symptoms of Tuberculosis" are given in three and three fourths pages, and so on. There is scarcely a subject which is adequately treated. In view of this, one would naturally look for a great many omissions of important matter, but it is hard to understand how even a cursory history of this subject can be given without referring to the work of the State Live Stock Sanitary Board of Pennsylvania, where for the first time in the world positive proof was given that the bovine tubercle bacillus was transmissible to human beings, this proof being adduced by the method laid down by Koch, namely, the isolation of cultures from persons who had died of the disease and the inoculation of cattle.

In the chapter entitled "The Cause of Tuberculosis," page 17, is sandwiched in some history and the statement that with Koch's announcement in 1901 "there began one of the most intense investigations into the nature of a disease that has ever been recorded."

For the truth of history it should be stated once for all that many investigations on this subject had been under way for years before Koch's announcement. At the laboratory of the State Live Stock Sanitary Board of Pennsylvania studies had been going on for three years previous to this, and at the Congress where Koch made his announcement a paper was read giving the results of these investigations, which to a large extent disproved the assertions of Koch. In 1902 the work from this same laboratory gave the final proof of Koch's fallacies. It is curious that the author of this book should have entirely omitted all mention of this work which has been widely published and certainly is easy of access.

The list of references is made up almost entirely of bulletins from State Agricultural Experiment Stations and the Bureau of Animal Industry, and no general list of useful papers on this subject is given. Among the references, Bulletin No. 75, Pennsylvania Department of Agriculture, 1901, is credited entirely to Pearson. It was a conjoint publication by Pearson and Ravenel.

The book lacks sequence. For instance, under "Method of Dissemination" in a summary by Peterson "on the finding of tubercle bacteria in the milk and excreta," on page 34, we find Abbott and Gildersleeve quoted on the relation between tubercle bacilli and other members of the acid-fast group.

Although Bulletin No. 75, Pennsylvania Department of Agriculture, is given as a reference, it is evident that the author gave as little attention to the contents as he did to the title. In the summary concerning the finding of tubercle germs in milk, which he quotes, he has entirely omitted the work given in that bulletin. This was quite an extensive piece of work, done with unusual care, and was among the first carried out in the United States on this point.

In a subsection on "Channels of Infection" we find the buying in of diseased cattle and infection through creamery and cheese factory by-products given—certainly not channels of infection.

The best chapter in the book, exclusive of

the report of the International Commission on Bovine Tuberculosis, is that on Tuberculin, which occupies nine pages.

These criticisms will show that the book is not one that can be recommended, and it should not be dignified with the title which it carries. It might pass as an experiment station bulletin, but nothing more. It is to be regretted that the "cacoethes scribendi" will run away with the judgment of good men, and lead to the publishing of such a book as this.

MATYCK P. RAVENEL

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*Catalogue of the Lepidoptera Phalaenæ in the British Museum.* Vol. XII. By SIR GEORGE F. HAMPSON, Bart. London. 1913. Pp. xiii + 626.

This volume contains the continuation of the family Noctuidæ, already partly treated in Volumes IV. to XI. of these catalogues. A part of the subfamily Catocalinæ is covered. A key to the genera is given, which will be reprinted in a more complete form in the next volume. Sixty-three genera with 643 species are fully described and a large proportion figured in colors in the accompanying book of plates, numbered CXCI. to CCXXI. The definition of the group, based on the presence of spines on the mid-tibiæ is somewhat artificial, as the author admits, but will probably not cause confusion in many cases. Otherwise it would be necessary to include this group in the already large subfamily Noctuinae. The treatment is similar to that already familiar to us in the preceding volumes and is a welcome addition to this indispensable work.

HARRISON G. DYAR

#### SPECIAL ARTICLES

##### SOME EFFECTS OF THE DROUGHT UPON VEGETATION

THE summer of 1913 was exceedingly dry and hot in many parts of the United States, but the combination of climatic and edaphic factors which produce that complex effect included under the term *drought* appeared to center in southeastern Nebraska, eastern Kansas, northwestern Missouri and southeastern Iowa. Lines of extremely xerophilous condi-